FEDERAL - STATE COOPERATIVE SNOW SURVEYS and WATER SUPPLY FORECASTS for ARIZONA

UNITED STATES DEPARTMENT of AGRICULTURE
SOIL CONSERVATION SERVICE

Data included in this report were obtained by the agency named above in cooperation with the Federal, State and local organizations listed on the last page of this report.

AS OF
FEB. 1, 1957

UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

TO RECIPIENTS OF COOPERATIVE SNOW SURVEY
AND WATER SUPPLY FORECAST REPORTS:

Snow surveys in the west are conducted each year at more than 1200 snow courses. Basin and Province or State snow survey reports summarizing the results of the measurements and forecasts of seasonal runoff and water supply are issued by the Soil Conservation Service, U. S. Department of Agriculture and some of its co-operators; the Water Rights Branch of the British Columbia Department of Lands and Forests; and the California Division of Water Resources.

Copies of the various federal-state cooperative snow survey reports listed below may be secured by writing to:

Head, Water Supply Forecasting Section
Soil Conservation Service
209 S. W. 5th Avenue
Portland 4, Oregon

BASIN REPORTS:

Colorado, Rio Grande, and Platte-Arkansas River Basins	Issued monthly February through May by SCS and Colorado Experiment Station, Fort Collins, Colorado.*
Columbia River Basin	Issued monthly January through May by Soil Conservation Service, Boise, Idaho.*
Upper Missouri River Basin	Issued monthly February through May by SCS and Montana Agricultural Experiment Station, Bozeman Montana.*
West-Wide Water Supply Outlook	Issued April 1 by Soil Conservation Service and Co-operators, Portland, Oregon.

STATE REPORTS:

Arizona	Issued semi-monthly January 15 through April 1 by SCS and Salt River Valley Water Users Association, Phoenix, Arizona.*
Nevada	Issued monthly February through April by SCS and Nevada State Engineer, Reno, Nevada.*
Oregon	Issued monthly January through May by SCS, Portland, Oregon, and Oregon Agricultural Experiment Station.*
Utah	Issued monthly January through May by SCS, Salt Lake City, Utah, and State Engineer of Utah and Utah Agricultural Experiment Station.*
Washington	Issued monthly February through May by SCS, Spokane, Washington, and State Department of Conservation and Development.*
Wyoming	Issued monthly February through May by SCS, Casper, Wyoming, and State Engineer of Wyoming.*

*Special reports are issued as needed.

The British Columbia reports are issued February 1 through June 1 and may be secured from Comptroller, Water Rights Branch, Department of Lands and Forests, Parliament Building, Victoria, B. C.

The California reports are issued monthly February 1 through May 1 and may be secured from Division of Water Resources, California Department of Public Works, Sacremento, California.

The annual water supply forecasts of the Weather Bureau are available in monthly bulletins published from January through May. These bulletins entitled, "Water Supply Forecasts for the Western United States" may be obtained from River Forecast Center, Weather Bureau, 712 Federal Office Building, Kansas City 6, Missouri.

COOPERATIVE SNOW SURVEYS AND WATER SUPPLY FORECASTS

for

A R I Z O N A

(Salt, Verde, Gila and part of Lower Colorado River Basin)

Issued

February 1, 1957

Report Prepared

by

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39 North Sixth Avenue
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Issued by

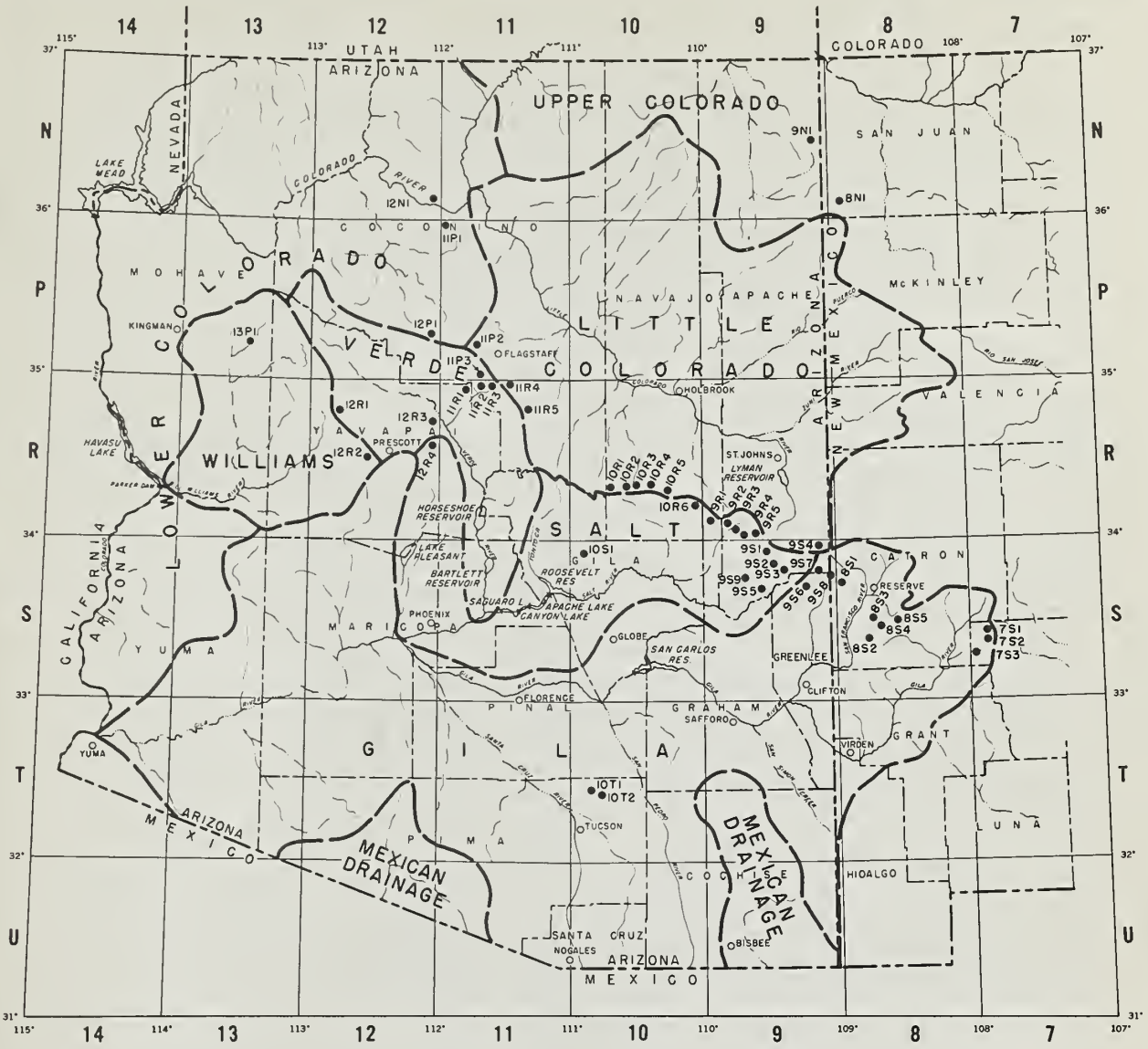
Salt River Valley Water Users' Association

and

Soil Conservation Service

Robert V. Boyle
State Conservationist
Soil Conservation Service

Victor I. Corbell
President
Salt River Valley Water Users' Assn.



LEGEND

DRAINAGE BASIN BOUNDARY

13U2 ● SNOW COURSE

ARIZONA
COOPERATIVE SNOW SURVEYS

SNOW COURSES AND DRAINAGE BASINS
JANUARY 1956

0 40 80 120 160 200

SCALE IN MILES

INDEX TO SNOW COURSES

NUMBER*	NAME	SEC	TWP	RGE**	ELEVATION	RIVER BASIN
11-P -3	Antelope Park	29	19N	8E	7300	Verde # ..... Discontinued
9-S -1	Baldy (p)	28	7N	27E	9000	Salt-Little Colorado
10-T -1	Bear Wallow	6	12S	16E	8100	Gila
9-S -6	Beaver Head	13	4N	30E	8000	Salt-Frisco
9-S -3	Big Lake Knoll	2	5N	28E	8800	Salt-Frisco-Little Colorado .. Discontinued
7-S -3	Black Canyon	8	13S	11W***	6790	Gila
12-N-1	Bright Angel	34	33N	3E	8400	Lower Colorado
12-R -1	Camp Wood	3	16N	6W	5700	Williams-Verde
10-R -3	Canyon Creek (s)	18	11N	15E	7500	Salt
11-R -2	Casner Park (s)	19	18N	8E	6950	Verde
12-P -1	Chalender (s)	27	22N	3E	7100	Verde
8-S -3	Corner Mountain	7	10S	17W***	8850	Gila-Frisco
9-S -9	Corn Creek (p)	Lat. 33°45'N. Long. 109°45'W. §			7730	Salt
9-S -7	Coronado Trail	26	5N	30E	8000	Salt-Frisco
10-R -2	Elk	31	11N	14E	7600	Salt-Little Colorado ..... Discontinued
10-R -6	Forest Dale (s)	2	9N	21E	6000	Salt-Little Colorado
11-P -2	Fort Valley	22	22N	6E	7350	Verde #
9-R -5	Ft. Apache	18	7N	27E	9160	Salt-Little Colorado
8-S -1	Frisco Divide	31	6S	20W***	8000	Frisco-Gila
12-R -4	Gaddes Canyon	11	15N	2E	7600	Verde #
10-R -5	Gentry	36	11N	15E	7600	Salt-Little Colorado
11-P -1	Grand Canyon	21	30N	4E	7500	Lower Colorado
11-R -5	Happy Jack	30	17N	9E	7630	Verde
10-R -4	Heber (p)	28	11N	15E	7600	Salt-Little Colorado
7-S -2	Inman	6	11S	10W***	7800	Gila
12-R -2	Iron Springs	22	14N	3W	6200	Williams-Verde
9-S -2	Maverick Fork (s)(p)	13	6N	27E	9050	Salt-Little Colorado
9-R -4	McKay Peak	13	7N	24E	8250	Salt ..... Not read
9-R -2	McNary (s)	14	8N	23E	7200	Salt-Little Colorado
9-R -1	Milk Ranch	28	8N	23E	7000	Salt
12-R -3	Mingus Mountain	3	15N	2E	7100	Verde #
8-S -2	Mogollon	2	11S	19W***	7000	Frisco-Gila
11-R -4	Mormon Lake	13	18N	8E	7350	Verde #
11-R -3	Mormon Mountain(s)	14	18N	8E	7500	Verde
11-R -1	Munds Park (s)	7	18N	7E	6500	Verde
8-S -4	N-Bar Lake	16	10S	17W***	8600	Gila
8-S -5	Negrito	6	10S	16W***	8200	Gila
9-S -4	Nutrioso	23	6N	30E	8500	Salt-Frisco-Little Colorado
9-S -5	Pacheta	§ At town of Maverick, Ariz.			7800	Salt
9-N-1	Roof Butte	15	8N	6W****	8500	Little Colorado # ..... Not read
10-T -2	Rose Canyon	15	12S	16E	7300	Gila
9-S -8	State Line	6	6S	21W***	8000	Gila-Frisco
7-S -1	Taylor Creek	20	10S	10W***	7850	Gila
9-R -3	Trout Creek	5	7N	24E	6400	Salt ..... Not read
8-N-1	Washington Pass	Lat. 36°05'N. Long. 108°50'W. §			8600	Little Colorado # ..... Not read
13-P -1	Willow Ranch	16	21N	11W	5000	Williams
10-R -1	Woods Canyon	15	11N	13E	7640	Salt-Little Colorado ..... Discontinued
10-S -1	Workman Creek	33	6N	14E	6900	Salt

* Number indicates location of course within coordinate rectangle, thus 9-N 1 is Course #1 in coordinate rectangle 9-N.

** All in Gila and Salt River Base and Meridian except where otherwise indicated.

*** New Mexico Principal Meridian.

**** Navajo Base.

On adjacent drainage.

(s) Soil Moisture Station installed on or in vicinity of course.

§ Unsurveyed.

(p) Storage gage installed on or in vicinity of course

M 178 A

ARIZONA WATER SUPPLY OUTLOOK

February 1, 1957

* *
* The outlook for Arizona water supply for *
* 1957 has improved slightly but is far *
* below average. The main shortage will be *
* in the Upper Gila River system. *
* *

SNOW COVER: Unfortunately equipment breakdown prevented the measurement of many important snow courses, so the data is not as complete as would be desired. However, results we have show that the late January storm considerably improved the snow pack. Most improvement has been in the Verde River drainage, Mingus Mountains and the western portion of the Mogollon Rim. This area shows a cover of 167 percent of a 15-year average for this year. However, many of the higher snow courses were not measured and, there being heavy snow on the lower courses, this percentage is not a true picture. On the Williams River the snow cover is about 300 percent of the 15-year average. On the Salt River and Little Colorado River the snow cover is about 88 percent of average. The Upper Gila River watershed shows the poorest cover, being only 55 percent of the 15-year average.

RESERVOIRED WATER: The stored water in Arizona is still critically low. Records show the storage in the Salt and Verde River system to be 57 percent of a 15-year average and only 2 percent of the total capacity. The storage in the San Carlos Reservoir is even lower, being only $4\frac{1}{2}$ percent of a 15-year average. On the Colorado River the stored water situation is somewhat better, being 67 percent of average. The Carl Pleasant Reservoir picked up considerable in the late January storm and is almost average for this time of year.

STREAM FLOW: At present the stream flow outlook has not improved enough to relieve the storage shortages for the irrigated valleys. The last storm improved conditions, especially in the Verde and Tonto Rivers, but it is still estimated that the January-May runoff in the Salt River water system at present has only a potential runoff of 50 percent of a 15-year average. The outlook on the Upper Gila River system is somewhat worse, having a potential of only 20 percent of average. This, coupled with the present storage shortage, still leaves a water shortage for many irrigated areas.

STREAM FLOW FORECASTS - FEBRUARY 1, 1957

The following summarized runoff forecasts are based principally on mountain snow cover and on the assumption that precipitation and temperature during the forecast period will be near average. Appreciable deviations from normal of temperature and/or precipitation during the forecast period will correspondingly modify these forecasts.

BASIN, STREAM AND STATION	SEASONAL STREAM FLOW IN THOUSANDS OF ACRE FEET FORECAST PERIOD JANUARY - MAY, INCLUSIVE					
	Forecast Runoff 1957	Percent 15-Year Average	1956	1955	1954	15-Year Average 1938-52
Salt River at Intake	123	31	141.1	56.6	234.3	392.4
Tonto River above Roosevelt 1/	78	149	10.6	4.9	31.4	52.2
Verde River above Horseshoe	150	58	60.4	73.8	193.5	257.0
Gila River at Virden	19	24	14.8	15.4	28.5	77.6
Frisco River at Clifton	11	16	13.1	12.1	32.4	70.4
Little Colorado River above Lyman Dam 1/2/	2	20	---	0.8	2.1	9.8

1/ Average is for less than 15 years of record in the 1938-52 period.

2/ Forecast period for Little Colorado River above Lyman Dam is for January-June, inclusive.

STATUS OF RESERVOIR STORAGE - FEBRUARY 1, 1957

BASIN and/or STREAM	RESERVOIR	USABLE CAPACITY 1000s AF	USABLE STORAGE - 1000 ACRE FEET			
			1957	1956	1955	15-Year Average 1938-52
Agua Fria	Lake Pleasant 1/	163.8	20.1	27.8	23.3	21.1
Colorado	Lake Havasu 1/	688.0	596.6	605.3	613.0	554.6
Colorado	Lake Mohave 1/	1,810.0	1,670.9	1,645.2	1,653.0	1,045.2
Colorado	Lake Mead	27,207.0	11,768.0	11,231.0	12,305.0	19,438.0
Gila	San Carlos	1,205.0	7.6	75.0	38.0	167.1
Verde	Bartlett 1/	180.0	77.2	75.7	54.0	48.7
Verde	Horseshoe 1/	143.0	23.3	2.5	1.8	15.5
Salt	Roosevelt	1,381.6	123.5	216.0	528.0	422.4
Salt	Apache	245.1	80.9	243.3	222.0	179.5
Salt	Canyon	57.8	54.7	53.6	18.5	29.3
Salt	Saguaro	69.8	47.9	66.8	53.0	19.2
Little Colorado	Lyman 1/	30.6	0.0	8.0	1.7	7.8
Little Colorado	Show Low Lake 1/ 2/	5.1	0.1	0.1	---	---

1/ Average is for less than 15 years of record in the 1938-52 period.

2/ Correction of Show Low Lake figures previously reported should be made as follows:

January 15, 1956 - Storage reported 1.2
Correct to 0.1

January 15, 1957 - Storage reported 1.3
Correct to 0.1

SUMMARY OF FEBRUARY 1, 1957 SNOW SURVEYS AND COMPARISON OF DATA WITH THAT OF PREVIOUS YEARS BY WATERSHED

WATERSHEDS	No. of Courses in Average	Snow Depth 1957 Inches	Snow Water Content in Inches				Snow Density 1957 Percent	1957 Water Content in Percent of	
			1957	1956	1955	1938-52 Average		1956	Avg.
Gila River	7	5	1.1	1.7	2.0	2.3	20	65	55
Salt River	8	12	2.1	2.5	2.8	2.4	18	84	87
Verde River	4	18	3.5	0.4	3.2	2.1	19	875	167
Williams River	2	18	4.3	0.0	3.6	1.4	24	---	307
Lower Colorado River	3	30	5.9	3.3	3.4	5.4	20	179	109
Little Colorado River	4	14	2.3	2.3	2.6	2.3	18	100	88

ARIZONA SNOW SURVEYS - FEBRUARY 1, 1957

DRAINAGE BASIN and SNOW COURSE	No.	Elev.	SNOW COVER MEASUREMENTS 1957 Date of Survey	Snow Depth (In.)	Water Content (In.)	PAST RECORD Water Content (In.) 1956	1955	1938-52 Average	Previous Yrs. of Record
GILA RIVER									
Nutrioso	9S4	8500	1/31	7	1.0	2.5	2.1	2.5	19
Bear Wallow 2/3/	10T1	8100	2/1	13	4.8	2.6	4.6	2.4	9
Frisco Divide	8S1	8000	1/31	8	2.0	2.5	2.8	2.1	19
State Line	9S8	8000	1/31	10	2.5	2.1	3.7	2.9	19
Coronado Trail	9S7	8000	1/31	5	0.9	2.3	2.5	3.7	19
Beaver Head	9S6	8000	1/31	8	1.1	1.5	2.6	3.2	19
Taylor Creek 2/	7S1	7850	1/31	T	T	0.5	0.0	0.7	15
Inman	7S2	7800	1/31	T	T	0.5	0.0	0.8	11
Rose Canyon 2/3/	10T2	7300	2/1	12	4.8	1.1	3.2	0.8	9
Mogollon 3/	8S2	7000	1/31	2	1.0	1.3	0.0	---	4
Black Canyon 3/	7S3	6790	Report Delayed			0.3	0.0	---	3
SALT RIVER									
Ft. Apache 1/2/3/	9R5	9160	No survey			---	4.3	6.3	7
Baldy 1/2/3/	9S1	9125	1/29	23	5.0	---	4.7	6.4	7
Maverick Fork 2/3/	9S2	9020	No survey			---	5.6	7.9	7
Nutrioso 1/	9S4	8500	1/31	7	1.0	2.5	2.1	2.5	19
Coronado Trail	9S7	8000	1/31	5	0.9	2.3	2.5	3.7	19
Beaver Head	9S6	8000	1/31	8	1.0	1.5	2.6	3.2	19
Pacheta 2/	9S5	7800	1/31	14	3.0	2.9	2.9	3.7	7
Gentry 2/3/	10R5	7600	No survey			1.9	3.6	3.8	7
Heber 2/3/	10R4	7600	No survey			1.8	4.0	4.1	7
Canyon Creek 2/3/	10R3	7500	No survey			1.7	4.4	4.6	7
McNary 1/2/	9R2	7200	1/31	16	2.8	3.2	3.1	3.1	18
Milk Ranch 2/	9R1	7000	1/31	14	2.8	3.5	2.5	1.9	16
Workman Creek 2/	10S1	6900	1/31	18	3.0	2.4	4.4	0.0	5
Forest Dale 2/	10R6	6430	1/31	13	2.6	2.1	2.2	1.3	17
VERDE RIVER									
Happy Jack 2/3/	11R5	7630	Report Delayed			---	3.6	4.3	6
Gaddes Canyon 2/3/	12R4	7600	1/31	23	4.3	2.6	2.9	---	3
Mormon Mountain 2/3/	11R3	7500	No survey			2.7	5.6	6.0	7
Mormon Lake 1/2/3/	11R4	7350	No survey			1.1	5.4	6.6	10
Fort Valley 1/2/	11P2	7350	1/31	19	2.7	1.5	3.0	3.7	10
Mingus Mountain 2/	12R3	7100	1/31	17	2.9	T	2.7	1.9	10
Chalender 2/3/	12P1	7100	No survey			0.5	4.4	4.1	10
Casner Park 2/3/	11R2	6930	No survey			0.8	5.7	4.9	7
Munds Park 2/3/	11R1	6500	No survey			T	4.8	2.7	7
Iron Springs 1/2/	12R2	6200	1/28	17	5.1	0.0	4.5	1.4	11
Camp Wood 2/	12R1	5700	1/31	19	3.5	0.0	2.8	1.4	11

1/ On adjacent drainage.

2/ All averages are for less than 15 years of record in the 1938-52 period.

3/ Not included in watershed average.

ARIZONA SNOW SURVEYS - FEBRUARY 1, 1957

DRAINAGE BASIN and SNOW COURSE	No.	Elev.	SNOW COVER MEASUREMENTS 1957 Date of Survey	Snow Depth (In.)	Water Content (In.)	PAST RECORD Water Content (In.) 1956	1955	1938-52 Average	Previous Years of Record
WILLIAMS RIVER									
Iron Springs 2/	12R2	6200	1/28	17	5.1	0.0	4.5	1.4	11
Camp Wood 1/2/	12R1	5700	1/31	19	3.5	0.0	2.8	1.4	11
Willow Ranch 2/3/	13P1	5000	Report Delayed			0.0	0.0	1.2	11
LOWER COLORADO RIVER									
Bright Angel 2/	12N1	8400	1/31	52	11.8	6.6	4.7	9.2	9
Grand Canyon 2/	11P1	7500	1/31	19	3.1	1.7	2.5	3.3	9
Fort Valley 2/	11P2	7350	1/31	19	2.7	1.5	3.0	3.7	10
Chalender 1/2/3/	12P1	7100	Report Delayed			0.5	4.4	4.1	10
LITTLE COLORADO RIVER									
Ft. Apache 2/3/	9R5	9160	No survey			---	4.3	6.3	7
Baldy 2/3/	9S1	9125	1/29	23	5.0	---	4.7	6.4	7
Nutrioso	9S4	8500	1/31	7	1.0	2.5	2.1	2.5	19
Happy Jack 1/2/3/	11R5	7630	Report Delayed			---	3.6	4.3	6
Gentry 2/3/	10R6	7600	No survey			1.9	3.6	3.8	7
Heber 2/3/	10R4	7600	No survey			1.8	4.0	4.1	7
Canyon Creek 2/3/	10R3	7500	No survey			1.7	4.4	4.6	7
Mormon Mountain 2/3/	11R3	7500	No survey			2.7	5.6	6.0	7
Mormon Lake 2/3/	11R4	7350	No survey			1.1	5.4	6.6	10
Fort Valley 2/	11P2	7350	1/31	19	2.7	1.5	3.0	3.7	10
McNary 2/	9R2	7200	1/31	16	2.8	3.2	3.1	3.1	18
Forest Dale 2/	10R6	6430	1/31	13	2.6	2.1	2.2	1.3	17

1/ On adjacent drainage.

2/ All averages are for less than 15 years of record in the 1938-52 period.

3/ Not included in watershed average.

ARIZONA SNOW SURVEYS - DELAYED REPORTS RECEIVED SINCE LAST BULLETIN (January 15, 1957)

DRAINAGE BASIN and SNOW COURSE	No.	Elev.	SNOW COVER MEASUREMENTS - 1957 Date of Survey	Snow Depth (Inches)	Water Content (Inches)
LOWER COLORADO RIVER					
Bright Angel	12N1	8400	1/15	18.0	2.7
Grand Canyon	11P1	7500	1/14	T	T
WILLIAMS RIVER					
Camp Wood	12R1	5700	1/15	0.0	0.0

LIST OF SNOW SURVEYORS

SNOW COURSE	SURVEYOR
Baldy	SCS and SRVWUA
Bear Wallow	A. F. Rea and J. R. Brinkley
Beaver Head	N. A. Josh
Black Canyon	Mr. Salyer
Bright Angel	Dee Bridges and George Epple
Camp Wood	Mrs. C. C. Merritt
Canyon Creek	SCS and SRVWUA
Casner Park	SCS and SRVWUA
Chalender	M. C. Oleson and T. A. Roll
Coronado Trail	J. D. McAdams
Forest Dale	R. E. Robinson, A. Valverde & R. Endfield
Frisco Divide	K. R. Weissenborn
Ft. Apache	SCS and SRVWUA
Fort Valley	Rocky Mt. Forest & Range Exp. Station
Gaddes Canyon	Richard Enz
Gentry	SCS and SRVWUA
Grand Canyon	J. Lynch
Happy Jack	Emil Ryberg
Heber	SCS and SRVWUA
Inman	C. H. McCauley
Iron Springs	Ernest Saxby
McNary	R. E. Robinson, A. Valverde & R. Endfield
Maverick Fork	SCS and SRVWUA
Milk Ranch	R. E. Robinson, A. Valverde & R. Endfield
Mingus Mountain	Richard Enz
Mogollon	J. R. Wray
Mormon Lake	SCS and SRVWUA
Mormon Mountain	SCS and SRVWUA
Munds Park	SCS and SRVWUA
Nutrioso	J. D. McAdams
Pacheta	Foch Phillips
Rose Canyon	A. F. Rea and J. R. Brinkley
State Line	K. R. Weissenborn
Taylor Creek	C. H. McCauley
Willow Ranch	Tiny Miller
Workman Creek	Rocky Mt. Forest & Range Exp. Station

The following organizations cooperate in the Arizona snow survey work:

FEDERAL

Department of Agriculture:

Soil Conservation Service

Forest Service
Apache Forest
Coconino Forest
Coronado Forest
Gila Forest
Kaibab Forest
Prescott Forest
Rocky Mountain Forest and Range Experiment Station

Department of Commerce:

Weather Bureau
Arizona Section

Department of Interior:

Bureau of Reclamation
Region III

Geological Survey
Arizona District

Bureau of Indian Affairs
Fort Apache Reservation

National Park Service
Grand Canyon National Park

Gila Water Commissioner
Safford, Arizona

IRRIGATION PROJECTS:

Salt River Valley Water Users' Association
Phoenix, Arizona

San Carlos Irrigation and Drainage District
Coolidge, Arizona

SOUTHWEST LUMBER MILLS, INC., McNary, Arizona

Other organizations and individuals furnish valuable information for the snow survey reports. Their cooperation is gratefully acknowledged.

Federal - State - Private

COOPERATIVE SNOW SURVEYS

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Furnishes the basic data necessary for forecasting water supply for irrigation, domestic and municipal water supply, hydro-electric power generation, navigation, mining and industry

"WATER IS THE WEST'S GREATEST RESOURCE"